

Amendment to the Specification

Example 2

Effect of Stabilization by Neutralization and Oil Dilution of the PIB on Sultone Formation

[0120] In a falling film reactor, SO₃ in air was reacted with a mixture of 70 wt% PIB having a Mn of 550 MW and 30 wt% oil (Group I 100 Neutral Oil) using the following conditions: SO₃/PIB molar ratio = 0.900; feed temperature = 90°C.; reactor temperature = 67.5°C.; SO₃ concentration in air = 1.4%; SO₃ loading = 0.347 kg.cm^{-hr}; SO₃/Air gas inlet temperature = 50°C.; PIB feed flow rate = 18.10 kg/hr; SO₃ flow rate = 1.66 kg/hr. Immediately (within 5 seconds) after formation in the sulfonation reactor, the mixture of PIB sulfonic acid and oil was stabilized by neutralization with a lime-oil slurry (10.6 wt% Ca(OH)₂ in Group I 100N oil). The degree of neutralization was 145%. After mixing the PIB sulfonic acid with the lime slurry, the mixture was passed through an inline static mizer and then into a stirred tank neutralization vessel held at 72°C. Chromatographic analysis of the stabilized product showed it to contain 26.0 wt% recovered PIB, 4.7 wt% sultones, and 69.3 wt% sulfonic acid, correcting for the diluent oil.

Amendment to the Abstract

~~An improved process for making stabilized polyalkenyl sulfonic acids, whereby the product resulting from the reaction between a polyalkene and sulfur trioxide is stabilized by neutralizing with a neutralizing agent prior to storage or further processing. Neutralization at this point in the process results in polyalkenyl sulfonic acid that is stable and has a decreased amount of sultones. A process for making a stabilized polyalkenyl sulfonic acid comprising (a) reacting a polyalkene with SO₃ in a first reaction vessel; and (b) stabilizing the product of step (a) by neutralizing with a neutralizing agent as the product of step (a) exits the first reaction vessel and prior to or concurrently with entering a second vessel~~

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for further reaction or storage, wherein neutralization occurs in the absence of ammonia or sodium hydroxide. A process for overbasing polyalkenyl sulfonic acids comprising overbasing the polyalkenyl sulfonic acid with an alkaline earth metal basic salt and wherein water is used as a promoter.